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8. (Amended) An apparatus according to claim 1,
wherein said light beam splitting optical system is a
crystal optical element.

9. (Amended) An apparatus according to claim 1,
wherein a boundary portion is formed on the surface of the
relatively moving object to generate a reflectance
difference.

10. (Amended) A magnetic recording apparatus
comprising:

a displacement detection apparatus comprising:

a light beam illuminating system for
converting a linearly polarized light beam emitted from
a light emitting element into a substantially parallel
light beam and irradiating a relatively moving object
with the light beam through a light beam splitting
optical system, said light beam splitting optical system
splitting the single parallel light beam emerging from
said light beam illuminating system into a plurality of
polarized light beams whose polarized states are
different from each other;

a focusing optical system for focusing the plurality of split light beams to different positions on a surface of the relatively moving object;

a polarizing prism for splitting reflected light beams from the relatively moving object on the basis of a difference between the plurality of directions of polarization;

a plurality of light receiving optical systems for individually detecting the different polarized light beams split by said polarizing prism and outputting light receiving signals of the respective light beams; and

a comparator for comparing light receiving signal levels of the respective light beams to detect a relative displacement of the relatively moving object,

wherein a slit-shaped marking or a three-dimensional marking is formed on the surface of the relatively moving object to generate a reflectance difference;

a head arm having the marking or reflectance boundary portion formed on an upper surface;

a rotary positioner having said displacement detection apparatus on a rotary arm; and

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a head arm drive motor control unit for controlling
a current of a head arm drive motor of a hard disk drive to
synchronize a motion of said rotary positioner with a motion
of said head arm so that an output from said displacement
detection apparatus becomes constant as a position of said
rotary positioner varies.

11. (Amended) A rotary encoder comprising:

a displacement detection apparatus comprising:

a light beam illuminating system for
converting a linearly polarized light beam emitted from
a light emitting element into a substantially parallel
light beam and irradiating a relatively moving object
with the light beam through a light beam splitting
optical system, said light beam splitting optical system
splitting the single parallel light beam emerging from
said light beam illuminating system into a plurality of
polarized light beams whose polarized states are
different from each other;

a focusing optical system for focusing the
plurality of split light beams to different positions on
a surface of the relatively moving object;

a polarizing prism for splitting reflected light beams from the relatively moving object on the basis of a difference between the plurality of directions of polarization;

a plurality of light receiving optical systems for individually detecting the different polarized light beams split by said polarizing prism and outputting light receiving signals of the respective light beams; and

a comparator for comparing light receiving signal levels of the respective light beams to detect a relative displacement of the relatively moving object,

wherein a slit-shaped marking or a three-dimensional marking is formed on the surface of the relatively moving object to generate a reflectance difference;

wherein the slit-shaped marking or reflectance boundary portion is formed on a rotary disk surface; and

said displacement detection apparatus is provided on a fixed object side to receive the plurality of reflected light beams from the marking or reflectance boundary portion on a moving scale and to detect a scale origin from a

difference signal between the plurality of light receiving signals.

12. (Amended) A linear encoder comprising:

a displacement detection apparatus of comprising:

a light beam illuminating system for converting a linearly polarized light beam emitted from a light emitting element into a substantially parallel light beam and irradiating a relatively moving object with the light beam through a light beam splitting optical system, said light beam splitting optical system splitting the single parallel light beam emerging from said light beam illuminating system into a plurality of polarized light beams whose polarized states are different from each other;

a focusing optical system for focusing the plurality of split light beams to different positions on a surface of the relatively moving object;

a polarizing prism for splitting reflected light beams from the relatively moving object on the basis of a difference between the plurality of directions of polarization;

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a plurality of light receiving optical systems for individually detecting the different polarized light beams split by said polarizing prism and outputting light receiving signals of the respective light beams; and

a comparator for comparing light receiving signal levels of the respective light beams to detect a relative displacement of the relatively moving object,

wherein a slit-shaped marking or a three-dimensional marking is formed on the surface of the relatively moving object to generate a reflectance difference;

wherein the slit-shaped marking or reflectance boundary portion is formed on a linear encoder scale surface, and

said displacement detection apparatus is provided on a moving object side to receive the plurality of reflected light beams from the marking or reflectance boundary portion on the linear encoder scale and to detect a scale origin from a difference signal between the plurality of light receiving signals.

13. (Amended) A magnetic recording apparatus comprising:

a displacement detection apparatus comprising:

a light beam illuminating system for converting a linearly polarized light beam emitted from a light emitting element into a substantially parallel light beam and irradiating a relatively moving object with the light beam through a light beam splitting optical system, said light beam splitting optical system splitting the single parallel light beam emerging from said light beam illuminating system into a plurality of polarized light beams whose polarized states are different from each other;

a focusing optical system for focusing the plurality of split light beams to different positions on a surface of the relatively moving object;

a polarizing prism for splitting reflected light beams from the relatively moving object on the basis of a difference between the plurality of directions of polarization;

a plurality of light receiving optical systems for individually detecting the different polarized light beams split by said polarizing prism and outputting

light receiving signals of the respective light beams;
and

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a comparator for comparing light receiving
signal levels of the respective light beams to detect a
relative displacement of the relatively moving object,

wherein a boundary portion is formed on the
surface of the relatively moving object to generate a
reflectance difference;

a head arm having the marking or reflectance
boundary portion formed on an upper surface;

a rotary positioner having said displacement
detection apparatus on a rotary arm; and

a head arm drive motor control unit for controlling
a current of a head arm drive motor of a hard disk drive to
synchronize a motion of said rotary positioner with a motion
of said head arm so that an output from said displacement
detection apparatus becomes constant as a position of said
rotary positioner varies.

14. (Amended) A rotary encoder comprising:

a displacement detection apparatus comprising:

a light beam illuminating system for
converting a linearly polarized light beam emitted from

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a light emitting element into a substantially parallel light beam and irradiating a relatively moving object with the light beam through a light beam splitting optical system, said light beam splitting optical system splitting the single parallel light beam emerging from said light beam illuminating system into a plurality of polarized light beams whose polarized states are different from each other;

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a focusing optical system for focusing the plurality of split light beams to different positions on a surface of the relatively moving object;

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a polarizing prism for splitting reflected light beams from the relatively moving object on the basis of a difference between the plurality of directions of polarization;

a plurality of light receiving optical systems for individually detecting the different polarized light beams split by said polarizing prism and outputting light receiving signals of the respective light beams; and

a comparator for comparing light receiving signal levels of the respective light beams to detect a relative displacement of the relatively moving object,

wherein a boundary portion is formed on the surface of the relatively moving object to generate a reflectance difference;

wherein the slit-shaped marking or reflectance boundary portion is formed on a rotary disk surface, and

said displacement detection apparatus is provided on a fixed object side to receive the plurality of reflected light beams from the marking or reflectance boundary portion on a moving scale and to detect a scale origin from a difference signal between the plurality of light receiving signals.

15. (Amended) A linear encoder comprising:

a displacement detection apparatus comprising:

a light beam illuminating system for converting a linearly polarized light beam emitted from a light emitting element into a substantially parallel light beam and irradiating a relatively moving object with the light beam through a light beam splitting optical system, said light beam splitting optical system splitting the single parallel light beam emerging from said light beam illuminating system into a plurality of

polarized light beams whose polarized states are different from each other;

a focusing optical system for focusing the plurality of split light beams to different positions on a surface of the relatively moving object;

a polarizing prism for splitting reflected light beams from the relatively moving object on the basis of a difference between the plurality of directions of polarization;

a plurality of light receiving optical systems for individually detecting the different polarized light beams split by said polarizing prism and outputting light receiving signals of the respective light beams; and

a comparator for comparing light receiving signal levels of the respective light beams to detect a relative displacement of the relatively moving object,

wherein a boundary portion is formed on the surface of the relatively moving object to generate a reflectance difference;

wherein the slit-shaped marking or reflectance boundary portion is formed on a linear encoder scale surface, and

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said displacement detection apparatus is provided on a moving object side to receive the plurality of reflected light beams from the marking or reflectance boundary portion on the linear encoder scale and to detect a scale origin from a difference signal between the plurality of light receiving signals.

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with the light beam through a light beam splitting optical system, said light beam splitting optical system splitting the single parallel light beam emerging from said light beam illuminating system into a plurality of polarized light beams whose polarized states are different from each other;

a focusing optical system for focusing the plurality of split light beams to different positions near an end portion of the relatively moving object;

a polarizing prism for splitting reflected light beams from the relatively moving object on the basis of a difference between the plurality of directions of polarization;

a plurality of light receiving optical systems for individually detecting the different polarized light beams split by said polarizing prism and outputting light receiving signals of the respective light beams; and

a light receiving signal comparator for comparing light receiving signal levels of the respective light beams to detect a relative displacement of the relatively moving object,

wherein a boundary portion is formed on the surface of the relatively moving object to generate a reflectance difference;

a head arm having the marking or reflectance boundary portion formed on an upper surface;

a rotary positioner having said displacement detection apparatus on a rotary arm; and

a head arm drive motor control unit for controlling a current of a head arm drive motor of a hard disk drive to synchronize a motion of said rotary positioner with a motion of said head arm so that an output from said displacement detection apparatus becomes constant as a position of said rotary positioner varies.

19. (New) A rotary encoder comprising:

a displacement detection apparatus comprising:

a light beam illuminating system for converting a linearly polarized light beam emitted from a light emitting element into a substantially parallel light beam and irradiating a relatively moving object with the light beam through a light beam splitting optical system, said light beam splitting optical system splitting the single parallel light beam emerging from

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said light beam illuminating system into a plurality of polarized light beams whose polarized states are different from each other;

a focusing optical system for focusing the plurality of split light beams to different positions near an end portion of the relatively moving object;

a polarizing prism for splitting reflected light beams from the relatively moving object on the basis of a difference between the plurality of directions of polarization;

a plurality of light receiving optical systems for individually detecting the different polarized light beams split by said polarizing prism and outputting light receiving signals of the respective light beams; and

a light receiving signal comparator for comparing light receiving signal levels of the respective light beams to detect a relative displacement of the relatively moving object,

wherein a boundary portion is formed on the surface of the relatively moving object to generate a reflectance difference;

wherein the slit-shaped marking or reflectance boundary portion is formed on a rotary disk surface, and

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said displacement detection apparatus is provided on a fixed object side to receive the plurality of reflected light beams from the marking or reflectance boundary portion on a moving scale and to detect a scale origin from a difference signal between the plurality of light receiving signals.

20. (New) A linear encoder comprising:

a displacement detection apparatus comprising:

a light beam illuminating system for converting a linearly polarized light beam emitted from a light emitting element into a substantially parallel light beam and irradiating a relatively moving object with the light beam through a light beam splitting optical system, said light beam splitting optical system splitting the single parallel light beam emerging from said light beam illuminating system into a plurality of polarized light beams whose polarized states are different from each other;

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a focusing optical system for focusing the plurality of split light beams to different positions near an end portion of the relatively moving object;

a polarizing prism for splitting reflected light beams from the relatively moving object on the basis of a difference between the plurality of directions of polarization; a plurality of light receiving optical systems for individually detecting the different polarized light beams split by said polarizing prism and outputting light receiving signals of the respective light beams; and

a light receiving signal comparator for comparing light receiving signal levels of the respective light beams to detect a relative displacement of the relatively moving object,

wherein a boundary portion is formed on the surface of the relatively moving object to generate a reflectance difference;

wherein the slit-shaped marking or reflectance boundary portion is formed on a linear encoder scale surface, and

said displacement detection apparatus is provided on a moving object side to receive the plurality of reflected